TPW 2186 | 4 CC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. 10/649,671 Confirmation No. 5679

Inventor: HIRAIWA, Y. et al.

Filed: August 28, 2003

Title: DISK SUBSYSTEM, COMPUTER SYSTEM, STORAGE MANAGING METHOD AND PROGRAM

Group Art Unit: 2186

Examiner: Unassigned

Attorney Docket No.: ASA-1154

Customer No. 24956

PETITION TO MAKE SPECIAL
UNDER 37 CFR §1.102(d) (MPEP §708.02(VIII))

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Applicants petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). In support of this Petition, pursuant to MPEP § 708.02(VIII), Applicants state the following.

(A) REQUIRED FEE

This Petition is accompanied by the fee set forth in 37 CFR § 1.117(h). A Credit Card Payment Form in the amount of $130 accompanies this Petition in satisfaction of the fee.

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The Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B) ALL CLAIMS ARE DIRECTED TO A SINGLE INVENTION

All the pending claims of the application, claims 1-5, are directed to a single invention. If the Office determines that all claims in the application are not directed to a single invention, Applicant will make election without traverse as a prerequisite to the grant of special status.

The claimed invention, as set forth in independent claims 1, 2, 3, and 5, is directed to a disk subsystem, a computer system, a storage managing method, and a management program for a disk subsystem in which a disk storage is accessible as logical volumes from a computer through a network. Under claims 1 and 2, the disk storage includes a CPU and a memory. The CPU reads volume management information owned by the disk storage to form information representing a configuration of the logical volumes, and the memory holds the logical volume information. Under claim 3, there is presented a storage managing method in the disk subsystem that includes the steps of: reading volume management information held in the disk

storage; and forming information representing a configuration of logical volumes from the management information.

Under an additional aspect, as set forth in claims 2, 4 and 5, a management computer may be included, and may receive information extracted from the volume management information based on the logical volume configuration information.

(C) PRE-EXMINATION SEARCH

A careful and thorough pre-examination search has been conducted, directed to the invention as claimed. The pre-examination search was conducted in the following *US Manual of Classification* areas:

Class	Subclass
369	30.19, 30.20
709	223
710	36
711	100, 112, 147

Furthermore, a keyword search was conducted on the USPTO's EAST database. Additionally, a literature search was also conducted for relevant non-patent documents using DIALOG online databases. In addition, a search for foreign patent documents was conducted on the ESPACENET databases.

(D) DOCUMENTS DEVELOPED BY THE PRE-EXAMINATION SEARCH

Of the documents reviewed during the search, those deemed to be most closely related to the subject matter encompassed by the claims are listed below. These documents were made of record in the present application by the Information Disclosure Statement filed December 8, 2004.

Document No.	Inventor
US 6735646	Fujibayashi et al.
US 20030055943	Kanai et al.
US 20030135439	Yagishita
US 20030163457	Yano et al.
US 20030187825	Tabata
US 20030220923	Curran et al.

Additionally, the following documents were made of record in the present application by the Information Disclosure Statement filed August 28, 2003.

Document No.	Inventor
US 6477619	Fujimoto et al.
US 20020069320	Yagi et al.
JP 2002-7304	Hiroyuki et al.

Because all of the above-listed documents are already of record in the present application, in accordance with MPEP § 708.02(VIII)(D), additional copies of these documents have not been submitted with this Petition.

(E) DETAILED DISCUSSION OF THE REFERENCES

A discussion of each the above-listed documents is set forth below, pointing out, with the particularity required by 37 CFR 1.111 (b) and (c), how the claimed subject matter is patentable over the teachings of the above-listed documents.

The US patent to Fujibayashi, US6735646, shows a system in which the access number of a logical volume is monitored and a change in access path is suggested to an upper class device to reduce the necessary bandwidth. (See, e.g., Abstract, column 3, lines 36-50, and column 5, line 38 - column 6, line 65.) Thus, Fujibayashi monitors access status, rather than volume management information owned by the disk storage, and Fujibayashi does not teach a disk storage that includes a CPU, wherein the CPU reads volume management information owned by the disk storage to form information representing a configuration of logical volumes. Accordingly, the present invention is patentable over Fujibayashi.

The published US patent application to Kanai, US20030055943, shows a storage system having a managing apparatus connected via a network or switch. The managing

apparatus is provided with a device allocation table and a configuration table, and is able to manage the allocation of the drives to external apparatuses that can use the drives. The external apparatuses directly access the drives via the network. (See, e.g., Abstract and paragraphs [0020]-[0022].) Kanai is distinguishable from the present invention in that Kanai relies on a device allocation table, whereas in the present invention, the disk storage includes a CPU that reads volume management information owned by the disk storage to form information representing a configuration of the logical volumes of the disk storage. Accordingly, the present invention is patentable over Kanai.

The published US patent application to Yagishita, US20030135439, shows a computer system for central management of a computer system. A management server collects information for managing the system. (See, e.g., Abstract, and paragraphs [0008], [0009], and [0084]-[0087].) Thus, Yagishita uses a management server for collecting system information, and Yagishita does not teach the present invention in which a disk storage includes a CPU and a memory, and the CPU reads volume management information owned by the

disk storage to form information representing a configuration of logical volumes. Accordingly, the present invention is patentable over Yagishita.

The published US patent application to Yano, US20030163457, shows a storage system having a plurality of physical storage devices, and a disk controller with a processor, a control memory, and a cache memory. A policy is set by a management device with respect to the placement of data blocks, and data of each file is evaluated with respect to the policy upon storage of the data blocks. A decision regarding which physical device in which to store the data blocks is made by the management device based on the result of evaluating the policy. (See, e.g., Abstract and paragraphs [0005]-[0006], [0021], [0023], and [0029].) Thus, Yano does not teach the present invention whereby the CPU of the storage system reads volume management information owned by the disk storage to form information representing a configuration of logical volumes. Accordingly, the present invention is patentable over Yano.

The published US patent application to Tabata, US20030187825, shows a storage system in which a plurality of host computers are connected to a plurality of storage units via a storage area network, and also connected to a management computer via a local area network. A first one of the storage units sends to the management unit a capacity calculated from the capacity of a storage region that can be offered by the first storage unit, and from any available auxiliary storage units. The management unit uses the capacity calculation for assigning the storage units to the host computers. (See, e.g., Abstract and paragraphs [0026]-[0028] and [0030]-[0031].) Thus the storage of Tabata includes a CPU and a memory, and Tabata transmits capacity information to a management unit. However, unlike the present invention, Tabata does not use the CPU of the disk storage volume to read volume management information owned by the disk storage to form information representing a configuration of the logical volumes in the disk storage. Accordingly, the present invention is patentable over Tabata.

The published US patent application to Curran, US20030220923, shows a method for controlling file access in a

multi-node, shared storage, data processing system. The shared storage may be accessed by two classes of nodes: application server nodes and metadata controller nodes. The metadata controller nodes control access to storage, and assignment of disk blocks. (See, e.g., paragraphs [0015]-[0017] and [0072].) Thus, Curran uses metadata controller nodes for controlling access to storage, and Curran does not teach the present invention, in which a disk storage includes a CPU and a memory, and the CPU reads volume management information owned by the disk storage to form information representing a configuration of the logical volumes in the disk storage. Accordingly, the present invention is patentable over Curran.

The US patent to Fujimoto et al., US6477619, shows a disk array controller that includes a plurality of disk array control units, each having one or more channel interface units for interfacing with a computer, one or more disk interface units for interfacing with disk drives, a cache memory unit that is connected to the channel interface unit and disk interface unit and adapted to store temporarily data which is written to or read out of the disk drives, and a shared memory

unit which is connected to the channel interface unit and disk interface unit. Also included is a means of interconnecting the shared memory units in the disk array control units and means of interconnecting the cache memory units in the disk array control units, thereby enabling the data read/write access from a channel interface unit or disk interface unit in one disk array control unit to a shared memory unit or cache memory unit in other disk array control unit. (See, e.g., Abstract, column 4, lines 1-34, and column 8, line 33 - column 10, line 23.) Thus, Fujimoto is directed to alleviating the deterioration of performance caused by data transfer among multiple disk array controllers which are designed to operate as a single disk array controller. Fujimoto does not teach the present invention, in which a disk storage includes a CPU and a memory, and the CPU reads volume management information owned by the disk storage to form information representing a configuration of the logical volumes in the disk storage. Accordingly, the present invention is patentable over Fujimoto.

The published US patent application to Yagi et al., US2003006932, shows a disk storage accessing system that is

provided with a counting means for counting the disk storage access frequency of each computer that refers to a disk storage. An instructing means is also provided for collecting and totaling a frequency of each computer accesses to the disk storage, and for instructing the disk storage to copy its contents into one or more other disk storages and for instructing the computer that has accessed the copy source disk storage after receiving a report on completion of the copying when the totaled access frequency is higher than a predetermined value, so as to change the access paths and access a target disk storage from the copy source disk storage. A means is also provided for changing access paths so as to access a target disk storage from a computer according to an instruction. The system includes a management computer provided with a resource monitoring/management unit for managing the disk storage access frequency in each of the storage area network (SAN) reference computers. (See, e.g., Abstract and paragraphs [0013]-[0015] and [0029]-[0033].) Thus, Yagi is concerned with changing access paths according to access frequency, and Yagi does not teach a disk storage that includes a CPU and a memory, wherein the CPU reads volume management information owned by the disk storage to form

information representing a configuration of the logical volumes in the disk storage. Accordingly, the present invention is patentable over Yagi.

The published Japanese patent application to Hiroyuki et al., JP2002-7304, shows a computer system that includes a storage area network (SAN) and plural client computers and storages. A terminal is provided with software for performing storage management including logical volume, data location, and fault monitoring. (See, Abstract.) Thus, Hiroyuki uses a management terminal for storage management, and does not teach a disk storage that includes a CPU and a memory, wherein the CPU reads volume management information owned by the disk storage to form information representing a configuration of the logical volumes. Accordingly, the present invention is patentable over Hiroyki.

CONCLUSION

The Applicants submit that the foregoing discussion demonstrates the patentability of the claimed invention over the closest-known prior art, taken either singly, or in combination. Accordingly, the requirements of 37 CFR

§1.102(d) having been satisfied, the Applicants request that this Petition to Make Special be granted and that the application be examined according to prescribed procedures set forth in MPEP §708.02 (VIII).

The Applicants prepared this Petition in order to satisfy the requirements of 37 C.F.R. §1.102(d) and MPEP §708.02 (VIII). The pre-examination search required by these sections was "directed to the invention as claimed in the application for which special status is requested." MPEP §708.02 (VIII). The search performed in support of this Petition is believed to be in full compliance with the requirements of MPEP §708.02 (VIII); however, Applicants make no representation that the search covered every conceivable search area that might contain relevant prior art. It is always possible that prior art of greater relevance to the claims may exist. The Applicants urge the Examiner to conduct his or her own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited above and any other prior art that may be located by the Examiner's independent search.

Further, while the Applicants have identified and discussed certain portions of each cited reference in order to

satisfy the requirement for a "detailed discussion of the references, which discussion points out, with the particularly required by 37 C.F.R. §1.111(b) and (c), how the claimed subject matter is patentable over the references" (MPEP §708.02(VIII)), the Examiner should not limit review of these documents to the identified portions, but rather is urged to review and consider the entirety of each reference.

Respectfully submitted,

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